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ABSTRACT

This paper is the first chapter in a monograph. In it the author attempts to examine the assumptions and justifications for process education. He does not write in a prescriptive fashion but attempts to arrive at a definition for process education by a successive convergency of ideas and tentative but logically consistent definitions. The author suggests that the operationalization of educational practice toward the goals of process education can be achieved by stating behavioral expectancy categories for pupils and teachers. A method for this procedure has also been suggested and is discussed briefly. The author concludes that process education is what education should be but has never been. Educational practice is still far from approaching this ideal. (Author/CP)

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WHAT IS PROCESS EDUCATION:

AN EMERGING RATIONAL POSITION

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Chapter 1

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FOREWORD

This paper is the first chapter in a monograph. It attempts to examine the assumptions and justifications for process education. It is not written in a prescriptive fashion but attempts to arrive at a definition for process education by a successive convergence of ideas and tentative but logically consistent definitions. Additional chapters will deal with implications for the behavior and interaction of pupils, teachers, and the curriculum. Later chapters will deal with procedures and techniques for the operationalization of educational practice consistent with the goals of process education. The position presented in this paper has been derived from the rational consideration of many existing curricula, their related documents, and the thinking of many scholars. Much of the work basic to the development of the present chapter is reported in "Analysis of Process Curricula" (Cole & Seferian, 1970).

I wish to acknowledge the assistance of Burton Andreas, Eileen Simonson, John Calvert, Richard Wallace, Margaret Berra, and John Herlihy for directing and focusing my attention on particular ideas and topics which were included in the chapter and for acting as critical and constructive readers of earlier

related documents and of the first draft of the present chapter. Burton Andreas' assistance over the past 20 months in clarifying my ideas about process education is especially appreciated. I am also indebted to Robert Gagné whose ideas as expressed in both his published writings and his conferences with ERIE staff have greatly contributed to this chapter. I also wish to thank Jo Ellen Purdy for much cheerful assistance in preparation of the manuscript and Robert Bontrager for editorial assistance and advice.

Henry P. Cole

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SLOGANS VS. SOLUTIONS

There is a danger in writing or talking about "process education." It was noted sometime ago by Dewey (1944, pp. 113-116). The danger is especially acute in this case because both the words "process" and "education" are highly connotative and intensional in their meaning. Even if their meaning can be made more denotative and extensional, the danger will still exist. What is this danger? It is simply that educators have a propoensity for forming oversimplified views about the complex. Educators tend to convert terms such as "process education" into slogans. This causes premature closure in thinking. The basic objectives, assumptions, and issues underlying the ideas which have been cast into the slogan are forgotten or ignored. Such oversimplification is maladaptive. It interferes with the delineation and implementation of the activities needed to meet the objectives, test the assumptions, and resolve the issues stemming from the original ideas which have been "sloganized." Dewey was afraid that his ideas would be cast into slogans. His fear was justified. This, perhaps more than any other single factor, has prevented the operationalization of "progressive" and "life adjustment" education.

As Rubin (1969d, p. 154) notes, it was not the goals but the approach to "life adjustment" education which deserved extinction. The goals of "progressive education were worthy. They are still judged to have value and utility by many of our leading contemporary scholars. The approach was phony. It was largely the slogan approach: That simpleminded view which involves substituting trite phrases as solutions for complex problems. The worst part of the problem is that teachers and other educators frequently develop strong emotional commitment to such slogans with little, if any, corresponding sense of the operational meaning of the term. This practice has been termed "the sin of evangelism" (Bellack, 1969, p. 291).

Many of the problems faced by the world and our nation have no apparent solutions, and none of these problems have definitive and final solutions. Everything which man has learned in the recent centuries indicates that no final solutions are possible. Solutions are always tentative, partial, and temporary. However, temporary and partial solutions are very useful. Their development and application represent an adaptive mechanism which is both basic to the nature of man and essential for his survival. The paradox is that the utilitarian application of temporary and partial solutions to existing problems creates new problems which

demand new solutions. Today's solution creates tomorrow's problem. This phenomena is everywhere apparent. The "pill" as a recent and partial solution to the problem of human over-population has already created many other pressing moral, social, and medical problems. Earlier solutions to the disposal of the wastes of our society and to control of plant and animal pests have created the very serious problems of environmental pollution and destruction. The earlier formation of the school as an institution for the necessary socialization of our youth in the tradition and heritage of the culture has contributed to today's problem of the failure of education to be logically related to the present and the future.

Man is a problem solver, and his social and physical environment present him with many problems to solve. The problems are becoming more acute and numerous because of his rapid technological evolution. His very survival is dependent upon his ability to cope with these new problems which are frequently outgrowths of solutions to old problems. Those who would substitute slogans for solutions will help bring about the extinction of man. Those who have substituted slogans for solutions to problems in educational practice have already made an unfortunate contribution toward this end.

If we are to talk about "process education," it must be our duty, therefore, to make the meaning of the term more denotative and extensional. This can only be partially accomplished in a single chapter. It will require many additional chapters and papers to examine the underlying objectives, assumptions, and issues related to "process education." Ultimately, these topics need to be examined in the light of empirical evidence about the effects of "process education" in actual practice upon human behavior and learning. Fortunately, there is much which has been written about this type of education which can be drawn upon. As these ideas are examined, the meaning of the elusive and complex idea of "process education" should become more clear. At best, it should emerge as a fairly global concept but with its parameters sufficiently well defined to allow for the beginning of the translation of its major objectives into behavioral expectancies for pupils and teachers. At worst, it could deteriorate into a new organization of empty old slogans.

IS "PROCESS EDUCATION" NEW?

Process education is not new in principle, but it has never been realized in practice in our schools.

A few years ago, educators, behavioral scientists, and content specialists in the disciplines became increasingly concerned with the "process" aspects of education (Bruner, 1960). By "process," they generally meant "what the individual must do to acquire and utilize information, generalizations, etc." Heathers (1965, p. 19) has stated this position nicely by saying, "The essence of education is found primarily in the process of acquiring and using knowledge, secondarily in the command of bodies of information and ideas." For some time, it has been recognized and supported by research that one cannot learn to derive and apply principles unless one has an opportunity to engage in rule-making and rule-following behaviors (Gagné, 1962, 1965a).

Many of the newer curricula concerned with process education have been directly influenced by these ideas. Others have been indirectly influenced. The result has been the development of curricula which have placed a strong emphasis upon means for the development of generalizable behaviors believed to have utility in the acquisition and application of knowledge. Most of those generalizable behaviors dealt with by these curricula are recognized to be basic to inquiry, self-directed learning, creative behavior, and problem solving (Cole, 1969a). The notion that curricula

and educational practice should be concerned with such generalizable behaviors is strongly and frequently expressed in the writings of Dewey (1900, 1933, 1944). The "Socratic method" and its originator were also concerned with the promotion of such behaviors. With a little effort, it is possible to identify many additional historical statements which recognize the power of educational practice concerned with the promotion of such generalizable behaviors believed to underlie inquiry, discovery, and the other numerous and related phrases used to describe adaptive and creative problem-solving behavior.

It is much less encouraging when one looks to see what effect the "process" ideas embodied in these new curricula have had upon educational practice in our schools. It is apparent that, even with the wealth of "new" curricular materials developed in the 60's and the recent emphasis upon "process" by leading scholars, educators, and researchers, educational practice in our schools is not committed to the goals of process education. If the reader doubts this statement, he should read "The Schools vs. Education" by John Goodlad (1969), Teaching as a Subversive Activity by Neil Postman and Charles Weingartner (1969), and Life Skills in School and Society edited by Louis Rubin (1969a). While reviewing the articles presented by several scholars in Life

Skills in School and Society, Rubin concludes that these suggest "that the schools are now preparing youth for a world which never again will exist" (p. 154). It seems to this author that perhaps this world never did exist.

GENERAL GOALS OF "PROCESS EDUCATION"

The primary goal of process education is to bring our schools and the educational community to the point where they will actively and purposely assist the learner in acquiring the generalizable behaviors he needs to cope with his world. Process education recognizes that the first and foremost objective of curriculum and instruction should be those skills which the learner needs if he is to acquire, organize, generate, and utilize in a productive manner the information available to him for coping with his world. These include the individual's motor, affective, cognitive, and social interactive skills. First priority should be given by the schools to the fostering of those generalizable behaviors or skills which equip the learner to cope with those "reality conditions" which justify process education. These conditions are stated and discussed below. The ultimate objective of process education is to help the individual to become a more effective identifier and solver of significant problems which must be solved if he and his fellowmen are to survive. That is what it means to cope.

GENERAL ASSUMPTIONS OF "PROCESS EDUCATION"

The Schools Can Make a Difference

The first and perhaps most basic assumption of process education is that our schools can and should be utilized to purposely and actively promote the generalizable behaviors which have been mentioned above. This is an assumption which is held in the face of much evidence that schools do not typically function very effectively in this role (Goodlad, 1969; Postman & Weingartner, 1969). However, it is an assumption held by many contemporary scholars and researchers as evidenced by their attempts to develop curricula and instructional practices for the promotion of such generalizable behaviors within the educational setting. These include Gagné, Bruner, Taba, Lippitt, Torrance, Williams, Parnes, Taylor, Kresse, and many others. Examples of curricula of this type developed by these and other scholars may be found in "Encounters in Thinking: A Compendium of Curricula for Process Education" (Seferian, Cole, & Bernstein, 1970).

Human Learning: A Creative and Unique Activity[1]

The view that learning involves the creative organization of the culture's knowledge with the individual's experiences to produce a new and unique perception of the culture by the

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[1]Relationships between aspects of process education and creativity development are discussed in two other interesting papers (Worthen, 1963; Cole, 1969a).

learner is common to many behavioral scientists (Parnes, 1967, pp. 2, 3, 5; Anderson, 1968; Crutchfield, 1969, pp. 55-57; MacKinnon, 1969; Woodruff, 1969;). Even a "fact" in becoming learned becomes a part of a new structure which is re-created or at least reorganized by the learner (Crutchfield, 1969, p. 55). It is interesting to note the correspondence of the equilibration theory of Piaget with this viewpoint (Flavell, 1966; Piaget, 1967). Piaget assumes that a child conceptualizes the world through the assimilation of information derived from experience into "his" previously-existing logical schema. However, the logical schema, which is never adequate for the assimilation of the new experiences the child continually encounters, is forced to accommodate itself to include this new information. Thus, the child's perception of the world at any given instant consists of a series of "creative products" which have resulted from the interaction of the existing schemata of the child with the stimuli of the environment. Since both the child's schemata and experiences are unique unto himself, the "creative products" of each child are also unique. In a discussion of learning by discovery, it has been noted that the "creative products" of the learner may consist of either the minor discoveries which can be assimilated within the learner's

existing schemata or major discoveries which require that he re-structure his thinking in a much more thorough manner (Shulman & Keislar, 1966, pp. 29-30).

It follows that learning can be considered a creative activity any time that anything is learned. "The scholar must form himself by his own exertions," (Crane, 1963, Yale Report of 1828, p. 87). This applies to the learning of "Who am I?" and "What is my worth and purpose?" of which Rogers (1961, 1962), Combs (1962), Kelly (1962), MacKinnon (1969), Maslow (1962), and many others have spoken. It also applies to the learning of tying one's shoes, the multiplication tables, Archimedes' principle, and the Newtonian synthesis. Furthermore, when the child learns Archimedes' principle or the Newtonian synthesis, they become his principle and his synthesis. This is what Postman and Weingartner (1969) have called "meaning making." As Drews (1963, p. 210) has pointed out, it appears that the creative activity involved in "meaning making" fosters the achievement and maintenance of the mental health of the individual. Rogers (1961) and many others make this point.

Problem Solving: The Application of Creative Activity

Creative activity and discovery are basic not only to learning but are the mechanism by which problem solving occurs. This statement is consistent with the findings of Guilford (1967) and Gagné (1965a, 1966, p. 150). The acceptance of this position is evident from the existence of programs designed to facilitate problem-solving behavior through direct instruction in stages of creative activity.

Stages of creative activity have been studied and enumerated by a number of scholars (Russell, 1956; Guilford, 1967). In discussing these stages, Gallagher (1964, p. 361) points out that each requires the individual to use a different cognitive style. He feels that attempts to train individuals to be problem solvers require that they become aware of the several stages and the various cognitive styles needed at each stage. The creative problem-solving courses and techniques developed by Parnes (1962, 1967) attempt to do exactly this. The Productive Thinking Program (Covington, Crutchfield, & Davies, 1967) also attempts to sensitize children to the need for different cognitive styles and attitudes at various stages in problem solving. The point to be made is that both of these programs are directly concerned with the facilitation of creative behavior <u>because their ultimate objective is to produce more effective problem solvers</u>.

Problem solving is dependent upon creative activity. To solve a problem is to create a solution. This is true if the solution involves only the selection of a previous solution which is judged to be reasonably appropriate to a new situation following some modification. If the choice of a solution requires no selection, judgment, or modification, there is no problem. Problem solving as a form of learning involves the creative activity of "meaning making." It enables the individual to cope with, rather than defend against, the problems he must and does encounter (Bruner, 1968, pp. 129-148). Coping behavior is required for a healthy and productive individual and society.

"Process" before "Product"

In order to prevent this catchy subtitle from becoming a slogan which will serve to obscure the issues underlying this assumption, it is necessary to consider a number of distinct but highly related topics.

Some important questions. Given the above assumptions that learning and problem solving require the individual to engage in creative activity to structure his own view of himself and his total environment, what is the value of the accumulated "knowledge" which is the "content" of the "disciplines"? What is "process"? What is its value and how is it related to the "content" of the "disciplines"?

Products of creative activity. The "knowledge," "content," and "structure" of the "disciplines" are all products of creative human activity. These products include such things as works of art, organizational schemas, concepts, and principles. Anderson (1968) points out that the products of creativity exist only in the past. Once a creative mind has produced, recorded, and communicated a product, it becomes a static and historical part of the cultural system. Given this assumption, all knowledge and the structure of the disciplines must be viewed as static products which have been created in an arbitrary fashion by individuals for use as temporary and partial solutions to problems encountered. There is no structure to reality other than the creative organizations of experience made by the learner. Coping with the world requires that the individual be able to create such structure (Bruner, 1960, 1969) or "viable meanings" (Postman & Weingartner, 1969). This does not mean that the past products of creative human activity, which include the acquired information, knowledge, and generalizations of a culture, are not useful to the learner. They are necessary but not sufficient for learning and problem solution. Thus, as Anderson (1968, p. 37) says, "The body of science is the residue of the repeatable of man's creative moments." However, the residue is static and historical. It becomes dynamic and

contemporary only when it is assimilated, accommodated, and applied to learning and problem solving by the individual. The assimilation, accommodation, and application of such previously existing creative products is in itself a creative activity which results in "new" creative products which have a new utility as partial and temporary solutions to contemporary problems. To learn is always to create a structure for knowledge. To solve a problem is always to create a solution.

Creative activity as "process." Learning and the solution of problems require the utilization of the highly generalizable adaptive behaviors underlying creative activity in order that such information and knowledge may be internalized, reorganized, and applied (Anderson, 1968, pp. 38, 45; Williams, 1968b, p. 236; MacKinnon, 1969, pp. 100-101). For clarity in the discussion that follows, those generalizable and adaptive behaviors which underlie all creative activity and which the learner engages in to acquire, organize, generate, and utilize information for problem solving can be defined as "process."[2]

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[2]The reader should note that the definition stated here for "process" is a temporary and partial solution to a problem in communication. Although logically consistent with a later definition of process education, the above definition applies to the term "process" and is not broad enough for or intended as a definition for process education.

Process as the essence of life. Unlike the static created products which usually comprise the content of the curriculum, the dynamic process of creative activity is always relevant. Process is never outdated. Furthermore, the dynamic process of creative activity is quite similar among different people while the products it produces are of an extremely diverse nature. The process of creative activity is in reality what the person must do to produce the product, which may be knowledge, concepts, generalizations, hypotheses, etc. Process consists of those same intellectual skills or generalizable behaviors that have been mentioned above. It should be recalled that the promotion of these adaptive and generalizable behaviors is the primary objective of process education. Anderson sums up the importance of such activity very nicely when he says:

> Creativity as process is important not because the product of each moment is such a gem but because the process is the essence of life itself [1968, p. 39].

This same point is made very clearly by numerous other scholars.

Process as content. The creative activity (process) which the individual uses to solve problems and to learn can be viewed as "content." In fact, the activity or behaviors humans engage in while attempting to cope with their physical and social environment are the subject of much study.

Psychologists have "created" and used information, knowledge, and generalizations about how humans create and use information, knowledge, and generalizations. Two well-known behavioral scientists have been much concerned with the creative activity or generalizable behaviors by which humans solve various types of problems in their physical and social environment. They have been influential in developing curricula for use in elementary schools which have as their content the study and facilitation of such generalizable behavioral strategies or skills. These men are Robert Gagné and Ronald Lippitt. While many would argue that the curricula which they have developed have many basic differences, it is very apparent that both have cast as primary content generalizable behaviors which help the individual structure his environment for effective learning and problem solving. A significant portion of the content of these two curricula is knowledge and generalizations developed by behavioral scientists about how humans (especially scientists) create and utilize information, knowledge, and generalizations for learning and problem solving. This is also true to some extent for curricula developed under the influence of Jerome Bruner. It is also true to a lesser degree for a number of other elementary curricula (Seferian, Cole, & Bernstein, 1970). Parker and Rubin (1966) and Michaelis (1968, 1970) have commented extensively on the use of process as content.

Content as Process

Another interesting point is that content can be considered as process. If a particular concept, principle, or generalization is considered as the product of some creative mind, it takes on a static "thing" quality. Yet, when it is used by a learner, it becomes a generalizable behavioral tendency or capability. When a concept, principle, generalization, or even a fact is in use in this latter sense, it is process and no longer content. This is a point which has been made on a number of occasions by Professor Gagné during conferences with the staff of the Eastern Regional Institute for Education (ERIE). As this has frequently puzzled people, an illustrative example or two might help.

Consider a 3- or 4-year old child learning the ordinal sequence of numbers from 1 to 5. He may first be drilled to commit to memory the arbituary sequence of vocal-auditory symbols one - two - three - four - five. This sequence of symbols represents a static product of the creative minds of early men. It has been passed down for thousands of generations with variations in the vocalized symbols but constancy in the ordinal meaning. The child quickly begins to internalize the rules which underlie the sequence. Thus, he learns one is always first, two is always second, three is always third, etc. When he has learned this, he has acquired a generalized

behavioral tendency which he utilizes in many situations. When the cookies are passed, he says, "I want to be first." When he is third in line for the cookies or for a "turn" in a game, he recognizes his position as following first and second. As he climbs the stairs, he frequently sings to himself, "One - two - three - four - five; one - two - three - four - five." He asks his parents if he was the first, second, or third child in the family.

Let us consider a second and more logically extreme example. Consider a rat learning a simple discrimination task in a "T" maze. Suppose the cues which indicate which way the rat should turn are a triangle and a circle. Assume the triangle is the cue always associated with the food which may be either on the right or the left of the "T" maze. When the rat has learned that the triangle stimulus is always associated with the food, he has, in fact, acquired a limited but somewhat generalizable behavioral tendency. His generalizable behavioral tendency can be observed and described as "When running the maze, he will usually turn in the direction of the triangle which may be either on the right or left." Thus, even what has been traditionally called "rote" learning in both humans and rats can be seen to involve process if process is defined as those generalizable behaviors which help the learner to structure his environment toward effective problem solving.

A silly question: Can process and content be separated?

There is frequently much talk about the separation of process and content. They can be separated conceptually as they have been above. That is, content may be considered as the static products of creative minds. Yet, the act of creating and using those products must be considered a creative activity or behavior in which the individual engages. In the reality of what the individual does to learn and solve problems, content and process blend into a continuum rather than exist as a dichotomy. It should be noted, however, that the major reality of what the learner does is process and not content. Postman and Weingartner (1969, pp. 83-85) point this out in a discussion of the mind existing as a process of "minding" and not as the inert object, "the mind," filled with static knowledge and information (1969, p. 83). Dewey made similar observations many times (1944).

In the reality of the activity of the individual engaged in learning and problem-solving behavior, process and content cannot be separated. This point is made by Worthen (1963), Heathers (1965), Rubin & Parker (1966), Taba (1966), Bruner (1968), Gagné (Andreas & Cole, 1968), and Michaelis (1968). However, it is clear that all of these scholars make the assumption that the typical emphasis in educational practice

upon content is ill advised. Educational practice should recognize as its primary objective the promotion of those dynamic generalizable behaviors the individual needs to acquire, organize, and utilize the information available from his environment. It is only through the potential for such creative activity that the individual can be expected to be an effective learner and problem solver.

Emotion and Affect are Essential to Learning

It has been noted that:

> ...as our society grows more complex, we must have what psychologists call affective education--the cultivation of competence in the emotional and interpersonal [Bennis, 1970, p. 68].

The solving of any problem requires the learner to have an emotional commitment to the solution of the problem. Learning cannot occur without the affective involvement of the learner in what is to be learned. The question of whether or not something to be learned is relevant to the child is really a question of whether or not the child feels a need to learn the "something." If the "something" is relevant for him, his emotional commitment to the task will make possible both the initial learning and the retention of what is learned. Affective commitment to what is to be learned is necessary for what Rogers has called "significant learning" (1961, 1967).

It is further assumed that significant learning occurs when needs, goals, and standards are intrinsic in their origin. This assumption is made by Snygg and Combs (1949, pp. 208-212), Rogers (1961, 1962, 1967), Combs (1962), Kelley (1962), Maslow (1962), and Williams (1969). It is based upon the research of these men and supported by the further work of Berlyne (1960, 1965) relative to the natural propensity of the organism to be intrinsically motivated to engage in exploratory behavior. Many studies have shown that the process of arousal which precedes activity toward problem solving or even problem seeking involves the emotional or affective commitment of the learner (Haber, 1967; Hunt, 1967).

It was pointed out sometime ago that:

> Children's acquaintance with emotions is much more profound than their acquaintance with other aspects of the world [Roe, 1959, p. 265].

Unfortunately, most educational practice does not recognize the central role of emotion in learning. It is the failure of our schools to establish the affective involvement of the young which leads to the "ho-hum," boring classroom which lulls so many pupils and teachers into a state of near sleep. Goodlad (1969) reports from his extensive observations that such "ho-hum" classrooms are more typical than atypical.

Beatty (1969) also comments extensively on this problem in "Emotion: The Missing Link in Education." Andreas (1968) notes the problem by referring to pupils as the "bored of education." These observations are confirmed by the author's own observations of a few hundred classrooms within the last four years. Certainly, significant learning cannot occur in classrooms where such an emotional vacuum exists. If educational practice is to be relevant, it must be concerned with felt needs of the learner.

There is another reason why educational practice cannot afford to ignore "competence in the emotional and interpersonal." The capability of the individual to work effectively with others toward the completion of particular tasks or activities requires the ability to establish meaningful affective interpersonal relationships (Erikson, 1959, 1963; Parsons & Bales, 1967; Bower, 1968). Since our culture is becoming more and more an arrangement of multiple temporary task forces or groups of individuals attempting to solve particular problems, it is more important now than in previous times for the individual to be able to both form and to dissolve meaningful interpersonal emotional relationships in short periods of time. We no longer have 20 years in which to establish the necessary affective bonds with our

co-workers. The atrophy of western man's capacity for the affective is a maladaptive condition which threatens survival in the "temporary society" in which we live (Bennis, 1969; Bennis & Slater, 1968).

Freedom is Essential to the Creative Activity of Learning

To function effectively, our schools must provide an atmosphere of acceptance which allows the child freely and repeatedly to engage in the behaviors which underlie the creative activities of learning. Acceptance tends to foster creative activity (Anderson, 1968). Acceptance of the learner's right to explore and create means he must be allowed much freedom. The notion that freedom is essential to learning underlies Montessori's (1965, pp. 86-106) notion of "discipline through liberty." She felt that it was morally wrong and pedagogically unsound to interrupt in any way the activity of a child involved in exploring some aspect of his environment. The appropriate behavior for a teacher, according to Montessori, is to provide the child with a rich and varied environment and to allow him the freedom and autonomy to structure it as he chooses. Hilda Taba (1967, pp. 29-30) has taken a similar position, and, as in the case of Montessori, these views are reflected in the type of elementary school curriculum she attempted to construct and

implement. All this implies, as many have noted, the right of the learner to commit errors. Bruner has pointed out that error in significant learning is probably not only to be expected but to be valued for it is frequently instructive (Bruner, Goodnow, & Austin, 1956; Bruner, 1960).

In commenting on freedom and its relation to learning, Dewey pointed out that the amount of external freedom needed for optimum learning varies from individual to individual depending upon his general maturational level and his coping ability (Dewey, 1944, pp. 69-76). Dewey, like Montessori, was very sure that freedom was not an end in itself but a condition prerequisite to self-initiated and self-directed learning. The assumption that freedom and autonomy are necessary for significant learning is a central topic in publications by Rogers (1961, 1962, 1967), Kelley (1962), Maslow (1962), Combs (1962), Torrance (1965), Crutchfield (1969), Bettelheim (1969), MacKinnon (1969), and many others. The assumption is derived in a large measure from the diverse research of these men and their colleagues with respect to human behavior and learning. Other research indicates that highly directive teacher influence tends to restrict learning and produce less desirable attitudes in children toward learning (Flanders, 1965; Amidon & Flanders, 1967; Amidon & Hough, 1967). This and much related research also shows that teachers who tend to be non-directive are

generally more effective. Amidon and Flanders note that this evidence - that unstructured, less directive instruction is generally more effective than its structured and highly directive counterpart - conflicts with many of the current assumptions and practices in our schools. Other evidence which tends to support the assumption that learning may be made more effective by increasing the autonomy of the learner may be found in the research concerning "learning by discovery" (Gagné, 1966; Shulman & Keislar, 1966; Wittrock, 1966).

The notion of freedom as it operates in learning is not a simple concept. Recent work with groups of children from various subcultures within our society has shown that differences exist across such groups with respect to their coping ability for specific tasks (Passow, 1963; Deutsch, 1963; Deutsch & Brown, 1967; Passow, Goldberg, & Tannenbaum, 1967; Roberts, 1967). Thus, a child from what has been referred to as a "disadvantaged" group may be able to effectively cope with much less autonomy than a typical middle class child with respect to learning arithmetic or reading skills. However, it is likely that the middle class child is much less able to cope with strong and highly emotional interpersonal confrontation than his "disadvantaged counterpart. Survival in their respective home environment requires

different coping behaviors. What is needed in our schools is the recognition and the ability to deal with individual pupils who differ widely on their coping ability for the learning tasks set for them. Basic to all of this is the acceptance of the child as an individual having worth and the potential to create.

Unfortunately, most educational practice does not communicate this feeling of acceptance and worth to the child or allow him the autonomy and freedom he needs to learn. As Prangnell (1969, p. 38) points out, the very architecture and maintenance procedures of the physical school building "represent sterile concepts of authoritarian education." He goes on to say that the indestructible nature of the furnishings and the building itself tend to communicate to the child that he is a vandal who cannot be trusted. The practice of "janitorial" intelligence communicates to him that he is a nuisance who must be watched over carefully and cleaned up after. Similar highly-salient observations concerning how the physical architecture of the school imposes upon the freedom of the child to learn are made by Ackerman (1969), Coles (1969); DeCarlo (1969), and Goodman (1969).

Both Postman and Weingartner (1969, pp. 20-21) and Rogers (1967, p. 174) provide us with statements of how our schools and teachers <u>really</u> feel about accepting the child and granting him the freedom and autonomy he needs for effective learning. Although many educators would hotly deny that these are valid observations, they are based upon the actual operational activities of our schools and can easily be validated by simple observation of school and classroom practice. The typical curriculum also allows the child only minimal opportunity to be free to learn. Rather, it is frequently concerned with imparting to the child those static products of other creative minds which are frequently not relevant to the child nor appropriate to his ability to cope with anything except more schooling.

Consider for a moment the typical school with respect to its physical structure, its staff, its teachers, its curriculum, and its instruction as all operationally defining the learning "medium" for the child. Think for a moment about McLuhan's (1964) statement, "The medium is the message." Now, ponder what is being communicated to the child about his worth and acceptance and his freedom to learn. Not very encouraging, is it?

Learning to Learn: A Natural and Most Useful Skill

This assumption has been stated by Rogers (1967) as:

> The most socially useful learning in the modern world is the learning of the process of learning, a continuing openness to experience, an incorporation of oneself into the process of change [p. 176].

There is hardly anyone who will argue with this assumption. It seems self-evident. Unlike many of the above assumptions, it has been firmly embraced by educators in theory and has been put into limited educational practice.

Our elementary schools in particular have concentrated on the promotion of language, reading, computational skills, and knowledge-referencing skills. As Heathers (1965) notes, these are tool skills which are instrumental to much further learning. However, learning how to learn involves much more than learning how to read, write, perform arithmetical computations, and look up information. Other critical tool skills which are frequently ignored by the schools are involved. These include skills of analytic observation, data collection and organization, inferring, hypothesis formation and testing, and many more. As mentioned earlier, a most critical set of tool skills are those responsible for a positive affect toward self-initiated exploratory behavior, problem solving,

and learning. Out schools typically devote little attention to the deliberate fostering of these additional vital skills which are even more basic and instrumental to learning than the reading, writing, computation, and knowledge-referencing skills which are emphasized in the curriculum but which are, in reality, secondary skills. Rubin (1969c, p. 19) refers to these more basic skills as "primary skills." They are required for the acquisition of the "secondary" skills, such as reading and writing, with which the curriculum is directly concerned.

Many studies have shown that our schools typically tend to inhibit and destroy the primary skills associated with the child's natural curiosity and tendency to learn through exploratory and creative interaction with his environment (Torrance, 1965, 1968; Strang, 1968; Williams, 1968a). Even in the areas of reading, writing, and computation where the schools have been most systematic in attempting to foster skills instrumental to learning, they have frequently failed because the child's will to learn has been inhibited. There is no better example of this than in reading. How can a child, or an adult for that matter, be said to be a reader if he hates reading? Undoubtedly, many of our youth who once had the capability to become fluent readers did not become so because their intrinsic motivational commitment to

the task was destroyed. The experiences provided for the child by the school, the teacher, and the curriculum and its content must be relevant to the child's felt needs and interests. To fail to be relevant is to risk the survival of the learner's interest, motivation, and commitment to learning. What skills can be considered more primary or instrumental to learning than those associated with the will to learn of which Andreas (1968) and Bruner (1968) speak? Attention to the development of such primary skills by our schools is needed to insure that learning will continue to be a great adventure for the child full of romance, thrills, and excitement.

If allowed the opportunity, children are active and avid seekers of knowledge and creative explorers of their world. They are, by their very nature, learners and problem solvers. It is known that the pre-school years of the child provide opportunity for and usually result in great amounts of learning. The fact that most children cope so well with the many and varied problems of kindergarten is ample evidence for this statement. We cannot afford to let our schools interrupt or interfere with the child's natural will to learn. To foster the child's commitment to the continued adventure of learning, the school must have much more awareness and concern for the primary skills which underlie the

will to learn. It goes without saying that these primary skills are largely affective.

Although Tentative and Arbitrary Knowledge is Essential to Learning and Problem Solving

Despite the assumption that all knowledge is tentative and arbitrary in its structure and organization, it must be recognized that knowledge is essential to problem solving and learning. Bruner has stated this cogently:

> Knowledge is a model we construct to give meaning and structure to regularities in experience. The organizing ideas of any body of knowledge are inventions for rendering experience economical and connected. We invent concepts such as force in physics, the bond in chemistry, motives in psychology, style in literature as means to the end of comprehension.
>
> The power of great organizing concepts is in large part that they permit us to understand and sometimes to predict or change the world in which we live. But their power lies also in the fact that ideas provide instruments for experience [1969, p. 120].

The important thing for our content specialists, curriculum builders, and educators to remember is that the content of the disciplines is invented and represents not "truth" but pragmatically useful means for explaining and sometimes predicting perceived reality. Some content generalizations are more widely applicable, useful, and stable than others.

Certainly our educational practice should not ignore the transition of such useful knowledge from one generation to the next. The point to be made is that such content should be transmitted through education to our youth but that it should not be transmitted as the "truth!" Thus, the very useful and highly generalizable concept that "all matter is particulate" should be taught but not as an absolute truth or law. It is not absolute. It is one of several alternative conceptualizations which is useful in explaining the interaction of matter and energy in many cases. In other cases, it fails entirely as an adequate explanation or is irrelevant. The field of classical thermodynamics is a good example of a case where this concept is irrelevant. All the basic theory was derived without the assumption that matter existed as particles. Another example is modern chemical bonding theory which finds it more convenient to conceptualize matter as consisting of probability distributions of energy fields rather than as particles. Physical scientists have learned it is necessary to have alternate conceptualizations of matter and energy. Sometimes it is more useful to consider both matter and energy as particles and at other times as continuous energy distributions. Even the notion of a dichotomy of matter and energy is not a truth but a convenient and sometimes useful conceputalization (Holton & Roller, 1958;

Kemeny, 1959; Blackburn, 1966; Heisenberg, 1966). As Kemeny (1959) points out, laymen often impart an absolute and prescriptive quality to scientific laws. They feel that scientific laws dictate reality and cannot be defied. This is really very humorous if one realizes that a scientific law is simply a concise statement of human experience with the behavior of matter and energy. Scientific laws have predictive utility in certain situations but are in no way prescriptive, absolute, or true. There are no truths. There are only arbituary but useful organizations of human experience which can be used to create meaning from that experience.

Studies of creative individuals who are capable problem solvers have shown they have acquired huge stores of knowledge. In addition, they have been shown to be avid seekers of knowledge always adding to their store (Torrance, 1965; Williams, 1968a). Therefore, if educational practice becomes more concerned with promoting the skills basic to learning, children can be expected to demand and seek more and more knowledge as they continue to engage in the thrill and adventure of "meaning making."

It should also be noted that not all the knowledge which can be useful to the child will arise out of his direct personal and social experience. There are certain highly

useful knowledge generalizations the child cannot be expected to encounter unless he is made aware of their existence. Bruner (1969, pp. 116-120) comments on this extensively and has suggested that those persons best qualified to establish the content for the curriculum are the scholars at the forefront of the disciplines (1960). The statement is based upon the premise that such persons are in a better position to judge which generalizations are most useful in perceiving the contemporary world.

If such content is to be learned, it must be viewed as relevant by the learner either by reason of his curiosity or perceived need for application. At first, the acquisition of such content may not exist as a "natural" felt need for the learner. However, as Bruner (1960, 1968, 1969), Karplus and Thier (1967), and many other scholars remind us, such "felt needs" for abstractions very much outside the normal range of experience of the child can and should be cultivated by education. Such cultivated felt needs can be extremely powerful and motivating. Anyone who has ever watched a skillful teacher expose children to knowledge and experience with dinosaurs and protozoa can confirm this. Both are beyond the direct experience of the child. However, both can be made fascinating to the child and can cause him to

seek to expand his direct experience and knowledge. Children will beg to go to the library to read about these topics and will plead to go fossil and protozoan hunting. Frequently, even "non-readers" will, on their own time, seek and read books on these topics. They will pester their parents for and even save money toward the purchase of a microscope, hand lens, or guidebook to fossil collection.

Process education must press for educational practice which is not only relevant to the child's world of the here and now but which causes him to greatly expand his actual experience and his capacity for experience and its organization through multiple intense feelings and abstract conceptualizations. Although educational practice seems almost obsessed with the transmission of the culture's accumulated knowledge to our youth, our schools and teachers frequently fail to stimulate the child's "will to learn" the content which they prescribed. The degree to which skillful teachers sometimes stimulate elementary pupils in the thrilling adventure to learn more about dinosaurs and protozoans is a rare exception in school practice.

JUSTIFICATION FOR PROCESS EDUCATION

Before it is possible to discuss those existing conditions which justify process education, it is necessary to

engage in some further definition of terms.[3] Otherwise, the discussion may become too connotative and intensional to be meaningful.

Process Defined as Creative Activity

In an earlier section, those generalizable and adaptive behaviors which underlie all creative activity and which the learner engages in to acquire, organize, generate, and utilize information for problem solving have been defined as "process." Let us continue to use this definition. However, it is necessary to further delineate the term "generalizable and adaptive behaviors."

Process = Creative Activity = Generalizable Behaviors = Coping Skills

In effect, process may be considered as what the individual must do to learn and solve problems. However, his behavior in "doing" may be actually observed only in part, for much of the "doing" appears to be internal emotional and cognitive activity rather than overt perceptual exploration and motor activity. However, there are physiological indicators which suggest the existence of such emotional and cognitive activity during learning and problem-solving

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3 The reader should again be aware that the definitions stated in this section are designed to facilitate an emerging definition of process education which is presented later in the paper.

behavior (Berlyne, 1960, 1965; Berlyne & McDonnell, 1967; Haber, 1967; Hilgard & Bower, 1966, pp. 426-479; Harper, Anderson, Christensen, & Hunka, 1964). Many studies concerning how the individual decodes, filters, processes, and encodes information from his environment, while engaged in learning or problem-solving tasks, have also led psychologist and human information theorists to postulate generalized perceptual, emotional, and cognitive skills which can be used to explain learning and problem-solving behavior (Garner, 1962; Fitts & Posner, 1967; Neisser, 1966). The work in the psychology of perception has been particularly interesting since it has shown that some perceptual skills appear to be innate, while others are acquired by experience, and that most such skills result from a complex interaction between the innate capabilities of the organism and the experience afforded by the environment (Kidd & Rivoire, 1966). The skills which result from such interaction may be said to be learned.

Many times, all these generalizable perceptual, cognitive, emotional, and motor activities have been collectively referred to as "intellectual" skills. However, since Webster's dictionary informs us that the common denotative meaning of "intellect" is "the power or faculty of knowing as distinguished from the power to feel and to will," the term "intellectual

skills" seems inappropriate as a label for these collective skills and is likely to be interpreted too narrowly by many. Since all these perceptual, cognitive, emotional, and motor skills are collectively involved in learning and problem solving, it is perhaps more accurate, with respect to denotative meaning, to name them "coping" skills. Coping requires learning and problem solving, and learning and problem solving, in turn, require the collective utilization of all of these skills. Although this last statement is logically circular, it represents the cyclical and cybernetic manner in which the human mind seems to deal with experience.

A Tentative Relationship Among Coping Skills, Learning, and Problem Solving

Learning may be defined as the structuring of experience by the individual. The skills which are needed for such structuring are both innate and acquired through experience. The skills which result from the interaction of the innate capabilities of the organism and the experience afforded by the environment are, in themselves, learned. This new set of interactive skills is essential to further learning and problem solving and may be collectively defined as coping skills. Problem solving may be defined as the application of structured experience (learning) and learned coping skills toward the fulfillment of needs. This is a tentative and incomplete specification of relationship between learning, problem solving, and coping skills.

In accordance with its general goals which have been stated above, process education is systematic activity concerned with the facilitation and further development of the individual's natural coping skills which, by definition, are generalizable and adaptive behaviors essential to all learning and problem-solving activity.

Reality Conditions which Demand Process Education

The term process has been further defined, and its basis in empirical behavioral research in motivation, emotion, cognition, perception, and human information processing has been noted. Let us now consider the justifications for education deliberately concerned with the promotion of such vital generalizable behaviors or coping skills. These justifications stem from the way the world is at the present. They have been noted and stated by many. An earlier and somewhat less comprehensive listing of conditions which justifies process education may be found in Bloom (1956, pp. 39-43). The listing which follows was compiled by the author following study of many additional documents and interaction with a number of scholars.

1. The world of the seventh decade in the 20th century is changing so fast that it is impossible to predict what knowledge and information individuals will need in just a few years. While some individuals attempt to minimize this

problem by noting that change has always been present, it must be realized that the rate of change is fantastically greater than ever before. This reality is made alarmingly clear by the observations of Bennis (1966, 1969, 1970), Bennis and Slater (1968), E. J. Meade (1969, pp. 35-38), and Postman and Weingartner (1969, p. 10). Therefore, it is vital that the education of our youth be concerned with helping them to acquire the generalizable and adaptive coping skills which have the power to serve them well in new situations.

2. The store of knowledge is so vast that it is impossible to instruct the student in anything but a small portion of what is known. The only feasible approach is to help the student acquire some of the more relevant and central information and those coping skills which will enable him to adapt and expand this limited knowledge acquired in his formal education.

3. The acquisition of generalizable coping skills insures an individual who can successfully solve problems, and this leads to a healthy and productive personality. This, in turn, tends to foster a healthy and productive society. Failure to achieve needed coping skills leads to mental and physical illness which are reflected in maladaptive and destructive behavior.

4. Coping skills are more widely applicable than knowledge. If we wish what the student learns to exhibit broad and useful transfer to all realms of his experience, then by definition, we must be concerned with the promotion of generalizable coping skills.

5. Coping skills are more permanent than other types of learning. It has repeatedly been demonstrated that information which is learned is subject to rapid extinction but that perceptual, cognitive, and affective skills are frequently life-long.

6. Information is easily obtained when needed, but coping skills cannot be "looked up." Information can be and usually is physically recorded somewhere. This means that information can be "looked up" or retrieved and, hence, be easily acquired when it is needed. However, the generalizable behaviors or coping skills are not so easily acquired. Since they are dynamic processes, they cannot be physically stored and later retrieved for use. It should be noted that, with the advent of the computer program, some types of logical "skills" can be stored and retrieved at will. However, it seems unlikely that computer programs can be expected to replace man's coping skills. Rather, the computer, like other tools man has developed, has awesome possibilities for extending human coping skills.

7. <u>An emphasis on coping skills in educational practice is needed to prevent academic isolationism</u>. There is a tendency for human knowledge to become isolated into conceptually distinct disciplines. This tends to focus educational activity around the static products of the minds of men from other times. It is this compartmentalization which has caused the content of curriculum and instruction in our schools to be largely irrelevant to the world of the here and now. Educational practice devoted primarily to promoting the understanding of the content and structure of the disciplines leads to cultural lag and stagnation. This cannot be tolerated in our "temporary society." This is not to say that there is not much knowledge which is useful. Great stores of knowledge exist and must be drawn upon in the solution of new problems. However, as was mentioned earlier, such knowledge alone is not sufficient for problem-solving activity. Neither is it the private possession of any single discipline. As both Roberts (1966, p. 354) and Tanner (1966, p. 363) have noted, educational practice must be interdisciplinary not only with respect to knowledge and content common to the disciplines but with respect to the <u>behaviors</u> common to the pursuit of knowledge in <u>any</u> discipline. These are the generalizable and adaptive behaviors or coping skills discussed above and with which process education is concerned.

8. Coping skills are required for learning to occur through formal education. The first major problems the child must cope with outside his home environment are primarily encountered in his school experience. When the child begins school, a tremendous increase occurs in the number of learning and problem-solving tasks set for him. These problems span virtually the entire spectrum of human functioning, including the interpersonal, cognitive, perceptual, motor, emotional, moral, and spiritual. The child's success for further learning and his capacity to develop into an effective problem solver who can cope with this diversity of problems are largely determined by his pre- and early-school experience. Therefore, educational practice cannot afford to underestimate the importance of purposeful and deliberate attention to the facilitation and development of coping skills. This is a major justification for process education in the pre-primary and early school years.

9. Coping skills are required for man's survival as a species. The survival of the human species is dependent upon man's ability to understand and tolerate the many and diverse value systems which lead to different assumptions, beliefs, behaviors, and cultural practices. In former times, there were fewer people in the world and less opportunity for them to be in contact with one another. During the last 50

years, the world has been torn by nearly continuous warfare waged by men against men frequently because of differences in their value systems and ideologies.

The advanced technology of this decade with its rapid transportation and instantaneous communication helps to bring diverse beliefs and values into more frequent direct conflict. If our youth are not taught to accept and analytically consider the existence of values and practices which conflict with their own, we can almost certainly expect more violence and warfare both internally as a nation and internationally as a species. In speaking about this type of problem, E. J. Meade (1969, p. 36) notes that contemporary society is a very primitive problem solver. He goes on to express the belief that this need not be the case. To the extent that humans can learn to cope with the moral and value problems which divide the modern world, the technological problems can be solved. All our pressing social problems which may appear to be of a technological origin have deep underlying moral issues which must be resolved. Educational practice must be concerned with promoting those skills which can help us to cope with moral and value issues. To the extent that process education is concerned with the promotion of such skills, it is certainly justified.

On the basis of these or similar realities of the present century, many scholars have argued the need for educational practice to be directly committed to the development of coping skills (Rogers, 1961, 196?; Worthen, 1963; Heathers, 1965; Torrance, 1965; Bruner & Dow, 1967; Covington, Crutchfield, & Davies, 1967; Cronbach, 1967, p. 28; Andreas, 1968; Bower, 1968; Bruner, 1968, pp. 34, 35, 38, 95, 99; Michaelis, 1968, 1970; Segal, 1968; Clark, 1969).

A DEFINITION FOR PROCESS EDUCATION

After the statements above, the reader may feel process education is all things to all men. It must be defined to a greater degree in order for it to be operationalized in educational practice in our schools, or it will almost certainly become a slogan having little utility and value. The task, then, is to state a definition that has sufficient denotative and extensional meaning to foster further meaningful communication about the topic.

The Process of Education: A Slogan, Not a Definition

In 1960, a book authored by Jerome Bruner entitled The Process of Education appeared. It is a fine book, and it has stimulated much constructive change in curriculum design, teacher education, and educational practice. Its impact will

undoubtedly be felt for many years in the future. However, its title has become a slogan. Some educators have indiscriminately used this slogan as if it were a definition. This can lead only to confusion.

Process education should not be referred to as "the process of education." In the first place, this implies the existence of a process of education. It seems certain that any conceivable definition which might be given to either "process" or "education" would have to recognize that these terms represent complex multivariate dynamic activities rather than a unitary sequence of activity. As Andreas has noted (1968, pp. 19, 86), there is no single process of education but only multiple processes of educational practice. The second problem with the term "the process of education" is that, to practicing educators, it connotes too much of school lunches, school buses, and syllabi. They tend to see "the process of education" as what they are doing. This is unfortunate since most of what they are doing has little to do with education.

If you think this statement is too extreme, think for a moment about the primary concerns of our boards of education, administrators, and teachers. Consider the problems they discuss at their meetings, the issues that lead to teacher strikes, and the way the money is spent in school budgets.

Our educational systems tend to be concerned with finances, transportation, classroom schedules, bond issues for new buildings, furniture, discipline, rules and regulations, selection of "new" instructional materials from the limited type and variety available, report cards, attendance forms, school lunches, vandalism, teacher benefits, building maintenance, etc. Almost never does one find a group of practicing educators who are concerned with the basic issues of learning and curriculum. Our society and our schools tend to assume that responsibility for the education of our youth means providing the physical plant and affiliated support services needed to put teachers and children into rooms together with some books, maps, and perhaps a few audiovisual materials. It assumes this is <u>all</u> that is needed to implement the goals of education. Our present educational practice indicates that we make elaborate plans and expenditures in time, effort, and money for almost everything except the learning which is somehow supposed to automatically occur in the classroom given a teacher, books, and pupils. Note the order of these three. The learning activity of pupils is nearly always last in priority of concern in our schools.

The existing process of education is not primarily concerned with learning. It is concerned with providing for and maintaining institutions called schools. It is assumed

that, if schools are maintained, education of our youth will occur. This is a most doubtful assumption.[4] When Bruner talked about the process of education, he did not have in mind the promotion of contemporary educational practice.

The Multiple Meanings of "Process"

As one studies articles written about process education, it soon becomes apparent that the term "process" is used in many different ways. Sometimes, it is used to refer to the "processes" of the scientist's mind. Sometimes, "process" is used to refer to the structure or generalizations of the disciplines, such as the processes of economics, natural selection, or thermodynamics. At other times, the term "process" is applied to the dynamic interactive behavior of groups. Sometimes, in individual or group therapy, "process" is used to describe a continuum of psychological activity through affective states "ranging from a rigidity and fixity of feelings, of feelings, of communication of self, of ways of construing experience, of relationships to one's problems, to a flow and changingness and spontaneity in these same areas" (Rogers, 1969, p. 60). At other times, "process" is

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[4]As mentioned earlier, if the reader feels the preceding statements are more emotional than rational, it would be wise for him to read the observations presented in "The Schools vs. Education" by John Goodlad and Teaching as a Subversive Activity by Neil Postman and Charles Weingartner. The author would also like to point out that the above statements are generalizations based upon ten years of participation in and much direct observation of the activity of many public schools, including classroom activity.

used to refer to generalizable behaviors, intellectual skills, or attitudinal capabilities. Still others use the term "process" to refer to the behavioral or mental activities of classical psychological study, such as motor processes, perceptual processes, attending processes, memory processes, and so on. The term "process" is sometimes also used as the label for arbitrary categories of human behavior, such as the process of "measuring," "classifying," "predicting," or "questioning." No wonder people have difficulty in understanding what "process" means! The problem is compounded by the fact that many individual authors frequently use the term "process" in several different ways, sometimes even in the same article.

Jerome Bruner's writings of a few years ago about "the process of education" leave one very unclear as to the meaning of the term process. This is also true of Worthen (1963), Heathers (1965), Crutchfield (1969), Burns and Brooks (1970), and many others who have written on the subject of process, process education, process competencies, or intellectual skills. It is not unusual to find other terms frequently used in educational jargon which have similar multiple and confused meanings. In a comprehensive book dealing with an appraisal of the research on "discovery learning" and its

role in educational practice, many of the contributors note the confusion surrounding the meaning of the terms "discovery" and "inquiry" (Shulman & Keislar, 1966).

Gagné's Definition of Process: A Useful Approach

In his earlier writings about process education, Gagné also used the term process two or more different ways in the same article (1965b). However, his recent writing and thinking offer what this author believes to be the best available definition of process. According to Gagné, processes are not some mysterious things which the learner acquires. What the learner acquires are attitudinal and behavioral tendencies and capabilities or habits in particular types of situations. The processes which are enumerated are merely externally-imposed names for certain arbitrary clusterings or categories of the behaviors exhibited by the learner. Process categories or processes are merely names for collections of attitudinal and behavioral tendencies and capabilities which are observed or inferred in the learner (Gagné, 1968a, p. 188). The attitudinal and behavioral tendencies and capabilities themselves are not static entities. Rather, they are simply conceptualizations useful in explaining the dynamic activity of learning and problem solving.

Just as important as what processes are is what they are not. "They are not entities of verbalizable knowledge," (Gagné, 1968b, p. 8). They are not content processes, such as the processes of thermodynamics or economics. Rather, they are the strategies, the behavioral capabilities, the psychological processes used by the individual to deal effectively with the content. Gagné's concern for this distinction between the learner's processes and the content of the discipline is apparent in a change in his nomenclature dealing with what he, at one time, called "concept" and "principle" learning (1965a). These were two of his eight types of learning. However, the terms "concept" and "principle" denote too much of the structure of the discipline and too little of what it is the person must do to master or use that structure. Therefore, Gagné has changed the terms to "classifying" and "rule following," both of which convey very clearly categories of behavior the individual is expected to exhibit. Note also the generality of his more recent terminology. "Principle" learning implies that a particular rule or set of rules is to be learned, whereas "rule following" implies a particular behavioral capability which allows the individual to apply and use any rule. The process is what the individual must do to apply and use a rule. Note that the process of "rule following" is behaviorally somewhat specific but that its use and application are generalizable

to the many situations where rule application and following is a useful procedure. It is this very generality of utility, sometimes known as potential for transfer, that makes education devoted to the promotion of such generalizable behavioral capabilities (process) so powerful.

Toward a Better Definition of Process Education

In earlier portions of this paper, process has been defined as those generalizable and adaptive behaviors which underlie all creative activity and which the learner engages in to acquire, organize, and utilize information for problem solving (See pp. 14, 18, and 36). Process is what the person must do to be an efficient learner and effective problem solver. As noted earlier, there is a large empirical basis in behavioral research which has led psychologists to postulate generalized perceptual, emotional, motor, and cognitive skills which can be used to explain learning and problem-solving behavior. Since all these perceptual, emotional, motor, and cognitive skills are used to explain learning and problem solving, it has been suggested that they be collectively referred to as "coping skills."

Processes or coping skills defined as arbituary categories of behavior. In learning and problem-solving activity, the individual acquires behavioral and attitudinal tendencies and

capabilities which enable him to organize his perceptions and responses to an infinite number of variations in his environment into a more finite set of connected and meaningful experiences. This is what the information theorists call creating redundancy (Garner 1962). Postman and Weingartner (1969) call it "meaning making." Bruner (1969, p. 120) calls it "rendering experience economical and connected." This is what individuals do when they learn and when they solve problems. They create and impose structure. Behavioral scientists and curriculum developers recognize this, and they frequently create their own structure which they use to enumerate and cluster attitudes and behaviors which they have observed or inferred in the learner. These clusters are given names. They may be the processes of the Science--A Process Approach curriculum (Science--A Process Approach Commentary, 1968), the mental processes of classical psychology (Andreas, 1968), lists of coping skills (Resnick, 1967), or any of the other categories previously discussed under the multiple meanings of process (See pp. 41-42). The point is that all such frequently enumerated processes or coping skills are merely externally-imposed names for certain arbitrary clusterings of attitudes and behaviors observed or inferred in the learner. Yet, many individuals tend to reify such categories of processes and coping skills. As is the

case with any abstractions, the processes and coping skills which have been enumerated by behavioral scientists and curriculum developers do not represent great truths, absolutes, or reality. Rather, they represent pragmatically-useful ways of dealing with human behavior.

Process defined as utilization of coping skills. Process may be defined as the use of those collective coping skills (or processes) acquired by the individual which result in gereralizable and adaptive behaviors needed for learning and problem solving in an environment in a state of constant change. Again, note that coping skills have the property of being behaviorally somewhat specific, but they result in the opportunity for broad transfer in application to learning and problem solving. Please note that process as defined here does not mean the same thing as processes or coping skills. Process is what the individual does to learn and solve problems. What the individual does is, in no way, dependent upon the arbituary categories of behavior (specified processes or coping skills) created by the behavioral scientist or curriculum developer to explain behavior. Rather, process occurs through the individual's acquired attitudinal and behavioral preferences and capabilities which may be very different in both content and organization from hypothesized lists of processes or coping skills.

A word about the utility of these definitions. Process, as defined above, is similar but somewhat broader than the definition stated by Gagné. It has utility since it and its related definition of "processes" or "coping skills" are quite inclusive. Consider what some of these coping skills or processes have been called. Gagné has referred to them as "learned capabilities" (1968a, p. 181), "intellectual skills" (1968b, p. 8), statements of "what the individual can do" (1968b, p. 8), "intellectual operations" (1968b, p. 10), and "processes" and "intellectual activities" (1965a, p. 4). Newell, Shaw, and Simon (1958) call them "processes" and equate them to Bruner's strategies (Bruner, Goodnow, & Austin, 1956; Bruner, Olver, Greenfield, et al., 1966). Bruner also calls them "skills" and "intellectual habits" (1968, pp. 34, 95, 99). Crutchfield (1969) calls them "skills." Andreas refers to them as "psychological processes" (1968). Skinner (1968) calls them "self-management behaviors." Williams (1968b; Williams & Eberle, 1968) has called them "processes." They are also the "process competencies" which underlie Heathers' (1965) "process goals." They are Worthen's "processes in education" (1963). They are the "affective and social interactive processes and skills" essential for learning and problem solving that are discussed so frequently by Rogers (1961), Combs (1962), Kelley (1962), Maslow (1962), Bettelheim

(1969), Brandwein (1969), Fox, Lippitt, and Girault (1969), Lippitt, Fox, and Schaible (1969), Meade (1969), and Rubin (1969b, 1969c, 1969d). They can be considered the taxonomic categories of cognitive functioning of Bloom (1956) or the categories of affective functioning of Krathwohl, Bloom, and Masia (1966). They may also be considered the operations of Inhelder and Piaget (1958), Guilford (1967), and Piaget (1967) and the abilities in thinking of Russell (1956, p. 10). All these and many other researchers have studied, enumerated, and discussed coping skills and processes in relation to education. Many of the individuals listed above have also been involved in the development of curricula purposely designed to promote such coping skills which are primary objectives of process education. This has a profound significance for the further delineation of an operational definition of process education. This significance will be discussed briefly later in this chapter and more fully in following chapters.

In addition to being able to include the conceptualizations of many scholars and reflecting their designs for instructional materials and procedures to promote the goals of process education, the above definitions of process and processes (or coping skills) have another important utility.

They focus on the behavior of the individual as he is involved in learning and problem solving. These definitions do not focus on content processes, such as the processes of economics, adaptation, natural selection, or thermodynamics. They do not focus on the mental processes of classical psychology, such as memory, perception, cognition, and attention. They do not focus on the processes of group dynamics. This is not to say that all of these other uses of the term process are not useful. They are. However, in attempting to operationalize educational practice for the promotion of process education, they are confusing and misleading because they mean both many and very different things.

Process, as used here, means simply "what the individual must do" relative to successful completion of the learning or problem task set for him. This applies whether the task set is a classical perceptual constancy task from experimental psychology, the learning of the dynamic relationships between supply and demand in economics or temperature differentials and heat flow in thermodynamics, or the learning of how one feels about oneself and how one relates to others in a sensitivity training session. It applies to the child's learning how to tie his shoes, to recite the alphabet, to decode printed symbols, or to explain his ideas to others. The key observation to be made in each of these cases which is most

useful to educational practice is, "What must the learner do to successfully cope with the task?" In short, we must think in terms of the behavioral expectancies we hold for the learner. The behavioral expectancies must be based upon our best knowledge and judgment of what behaviors are needed to cope with particular types of problem-solving and learning tasks.

Behavioral expectancies: A means to the operational definition of process education. A number of the scholars discussed above who have thought and written about process education have also attempted to influence current educational practice by their direct intervention into teacher education and curriculum development. This provides a most fortunate and opportune situation for the general operationalization of process education in educational practice. Although these scholars differ with respect to their terminology and their strategy, it is clear they all generally recognize the broad goals, assumptions, and justifications for process education. The differences in nomenclature and theoretical positions are troublesome and confusing. However, these scholars have attempted to operationalize their ideas in actual teacher education, curriculum, and educational practice in classrooms with real students and teachers. This means that differences

in nomenclature and underlying theory need not obscure the opportunity to see what these scholars ask the pupil and teacher to do. Obviously, to implement any ideas into educational practices requires that pupils and teachers engage in some type of doing.

One of the best ways of operationalizing process education may be to carefully study exemplary curricular and teacher education materials produced by these behavioral scientists and educators. At ERIE, selected process curricula and their wealth of related documentation dealing with underlying theory, teacher education, program development, objectives, and evaluation have been studied. The study has been extensive, involving both direct interaction with the scholars who developed the programs and actual installation of the curricula into elementary schools under ERIE's supervision. The choice of the curricula for study was in itself a time-consuming and fairly complex task. Other documents deal with the details of these procedures (Andreas, 1970; Cole, 1970; Cole & Seferian, 1970; Seferian, Cole, & Bernstein, 1970). The results of this activity will be incorporated in following chapters.

As a result of this activity, a few generalizable behavioral expectancy categories for both pupils and teachers have emerged. These categories tend to define what it is the

teacher and pupil are to do when using these process curricula (Berra, Calvert, Cole, et al., 1969; Cole, 1969b, 1969c). The first set of expectancy categories is crude and is currently undergoing further delineation and refinement. Ultimately, they may be used to define clearly and operationally the major parameters of educational practice devoted to the goals of process education. This should both greatly facilitate the development of teacher education programs and the evaluation of the effects of process curricular and educational practice relative to specified behavioral categories of pupil competence. Furthermore, the behavioral expectancy categories stated for pupils and teachers for an operational approach to process education may be subjected to empirical study in multiple school settings. Thus, what is now a rational basis for the practice of process education may become, when studied in multiple school settings and subsequently modified and revised, an empirical basis.

Education: A word with a forgotten meaning. Webster's dictionary (1967, p. 263) defines "education" as "the action or process of educating or being educated." As noted earlier, "the process of education" is what practicing educators see themselves as doing. However, as pointed out earlier, what they are doing has little to do with education since they are primarily engaged in operating and maintaining institutions

called schools. It is assumed that maintaining schools will result in education of our youth. In the struggle to provide a formal setting for education, our society has fixated upon the physical and logistical problems of the school and has largely forgotten the primary meaning of education. As Postman and Weingartner (1969, p. 62) point out, the meaning of "education" should be considered relative to the word "educe" from which it is derived. "Educe" means "the bringing out of something potential or latent." Educational practice should be concerned with educing the potential within the learner. It should recognize that learning and problem solving are natural creative activities. It should be designed to begin with the experience and meanings already accrued to the learner for the purpose of stimulating him to actively extend, modify, and reorganize his experiences and meanings. Educational practice should have as its primary focus, not the operation and maintenance of schools, but the cultivation of the behavioral capabilities of the learner. Indeed there are numerous slogans which state that our schools are concerned first and foremost with educing the learner's potential. However, the slogans have little counterpart in educational practice.

A definition for process education. Process education is that systematic activity of the society which is devoted to facilitating and developing the natural capacity of the child to cope. It focuses on the individual and seeks always to be operationalized by asking the question, "What must the learner do to cope with the learning and problem-solving tasks presented by his contemporary world?" It is based upon the assumptions stated in the first portion of this paper, and it is justified in terms of the reality conditions of the present world which are also set forth. Process education is, pure and simple, what educational practice should be but has never been. It is a limit of perfection to be approached.

A WORD ABOUT THE STRUCTURE OF THIS CHAPTER

The immediately preceding definition for process education would have meant very little to the reader had it occurred early in the chapter. It would have remained very connotative and intensional. Hopefully, viewed against the earlier stated assumptions, justifications, and definitions of related terms, the definition for process education has become more denotative and extensional than is usual.

It would have been easier to structure the chapter in a more conventional way by beginning with a definition of process education and its related terms. However, such an

arrangement would have encouraged the reader to reach premature closure in thinking and to find false security in the conceptualization of a complex and elusive topic. There has already been too much reification of particular "process" categories, "processes," and "coping skills" by many educators. As noted earlier, this leads to the creation of slogans which initially may have much emotional meaning but which almost never have an operational utility.

This chapter was structured to force the reader to cope with the complexity and breadth of the topic. As you have read the preceding pages, you may have been assisted in the making of your own viable meaning for process education. You should have realized that the convergence of ideas presented here lead only to a definition and not to the definition for process education. Perhaps this chapter will help you view as inappropriate and inadequate the attempts to define process education simply or exclusively in terms of the process categories of particular curricula; the skill lists of particular scholars and behavioral scientists; the mental processes of classical psychology; the content processes of the disciplines; or the interactive processes of social psychology. You may have been made more impatient to seek an operational definition for process education which defines

general parameters for the behavior and interaction of pupils, teachers, the curriculum, and the school. To the extent that this chapter has stirred such awareness and feeling, it has met its objective.

ARE THE GOALS OF PROCESS EDUCATION NOW BEING MET?

There are really two questions here. These are, "Are the goals of process education generally being met by our society?" and "What contribution is educational practice making to the attainment of the goals of process education?"

Are the Goals of Process Education Being Met by Society?

As is frequently the case, the answer to the first question is both yes and no. Our society has developed many competent problem solvers and learners whose talents have been used to solve many pressing technological and social problems in the past decades. However, it is quite apparent that the number of new serious problems which must be solved has increased proportionate to the tremendous increase in the rate of change. It is also abundantly clear--from observation of our economic, government, political, industrial, spiritual, educational, and other social institutions--that our ability to cope with the ever-increasing number of problems is being severely taxed. Some believe our technology

and industry, in the course of its exploitation of our water, air, and other resources, may have already caused irreversible damage to the planet's ecology which will ultimately result in our extinction. Unfortunately, such views cannot be dismissed as wild speculation. It would appear the world needs more problem solvers to cope with the more numerous problems or else fewer problems with which to cope. The latter possibility seems unlikely.

Is Educational Practice Attaining the Goals of Process Education?

In the earlier sections, it has frequently been pointed out that, in their actual practice, our schools tend to be in conflict with the assumptions and justifications stated for process education. Some of the unstated assumptions which underlie educational practice have been noted by Rogers (1967, p. 174) and Postman and Weingartner (1969, p. 20). These include:

> The student cannot be trusted to pursue his own learning.
>
> Presentation equals learning.
>
> The truth is known.
>
> The aim of education is to accumulate brick upon brick of factual knowledge.

> Constructive and creative citizens develop from passive learners.
>
> The voice of authority is to be trusted and valued more than independent judgment.
>
> Feelings are irrelevant in education.
>
> Discovering knowledge is beyond the power of students and is, in any case, none of their business.
>
> Passive acceptance is a more desirable response to ideas than active criticism.

That the schools hold such assumptions is evident from direct observation of educational practice (Goodlad, 1969, p. 60). It is also apparent from their actual physical organization and architecture (Ackerman, 1969; Coles, 1969; DeCarlo, 1969; Goodman, 1969; Prangnell, 1969). That educational practice based upon such implicit assumptions is the antithesis of process education is a certainty.

Strangely, practicing educators do not usually recognize the real assumptions which underlie their practice. As Goodlad (1969, p. 61) points out, most teachers have a favorable image of what they are doing in the classroom. Many teachers and principals can read the assumptions stated for process education and with much apparent feeling and extensive verbalization "dedicate themselves to these ideals" and yet continue to deal with their students in ways completely inappropriate to the ideals. The reason for this is

that, for practicing educators, the goals, assumptions, and justifications for process education are slogans. Many of them are not even new slogans. Those involved in educational practice have found that slogans should be stated, shouted, and pledged allegiance but that they have little or no relation to the operational activity of the school and the classroom. Consequently, there is a second set of assumptions and rules for the "actual" education of the child in the "real situation" of the classroom. Some of the unstated assumptions of educational practice have been stated above. They dictate that most school and classroom practice be directed toward managing the child to <u>make him learn and to make him do what is prescribed for him by the teacher and the curriculum</u>.

The idea that the child must be <u>made to learn</u> and <u>made to do</u> is very central to most educational practice. The notion is based upon the assumption that children generally have a tendency to avoid learning and to "misbehave." Since a significant number of the learning tasks set for students in the classroom are not related to their experience, are dull and boring, and are concerned primarily with the rote and associative learning of facts, the pupils do indeed frequently try to avoid the prescribed learning and have a quite natural tendency to be more interested in things other than the learning tasks set for them. This pupil behavior

provides teachers with reinforcement for their ideas on the need to force the child to learn and to behave acceptably. Thus, most teachers press on, viewing themselves as "content" specialists and perceiving the "forced" transmission of the body of information of their specialties or disciplines to their students to be the first and, in most cases, the only matter of importance despite lip service paid to other views. This attitude is especially widespread among secondary school and college teachers and is frequently emulated by elementary school teachers. Curriculum developers, state education departments, and textbook publishers have also made a large contribution to this most unfortunate attitude. As Roberts (1966, p. 353) notes, most innovative curricula have been designed for the purpose of cramming more information into students. The same thing may generally be said about state education department curriculum guides. Every year, they seem to get thicker, and the list of what the student is supposed to be made to "know" grows longer and longer.

In all aspects of educational practice, little emphasis is placed upon objectives and procedures dealing with assisting the learner in the motivation for learning, discovery, acquisition, organization, and application of information. In short, educational practice is too caught up with

the static content of the "disciplines" which is so readily prescribed as essential for the learner while ignoring the question of why he needs it or what he and the teacher must do to help him acquire, organize, and utilize that information.

The schools have probably achieved most success where they have been concerned with the development of coping skills. One vital set of coping skills in modern society centers around the ability to decode and comprehend written and spoken symbols. Elementary schools have placed much emphasis upon reading and related language arts skills. They have undoubtedly helped to produce a large number of literate people. However, not all of this accomplishment can be attributed to formal instructional practice. A good deal of the credit must go to the interaction of the child in the home, both prior to and during formal schooling. Here the fluent language of his family and his exposure to a wide variety and type of printed and illustrated materials are seen to be a key factor in learning to speak and read effectively. It has been repeatedly demonstrated that schools have great problems in teaching language and reading when children have not been raised in such a rich verbal environment. As mentioned earlier (pp. 28-30), this is undoubtedly because the schools typically devote little attention to the primary skills which are needed to foster the development of secondary

skills, such as speaking and reading. Chief among these primary skills are the ones dealing with affect and motivation. They seem to be largely acquired and facilitated by the extra-school environment. As was also noted earlier, many studies have shown that educational practice in our schools often destroys or inhibits these most critical primary motivational skills. Thus, the literacy we commonly attribute to our schools may be as much a function of a free press and a huge number and variety of printed and well-illustrated media coupled with a larger number of families able and willing to provide in great abundance in the home both the language and the printed materials known to facilitate the development of the secondary reading and language skills. Cartoons, cereal boxes, comic strips, pulp magazines, paperbacks, and beautifully illustrated magazines, such as National Geographic, may be more stimulating, motivating, and ultimately more instrumental to the promotion of reading skills than what is frequently formally prescribed in our schools. Furthermore, the content of such "extra-curricula" sources is apt to be considerably less static and sterile and, therefore, more useful than the content usually prescribed for formal classroom use.

Generally, it appears that our schools are not promoting the goals of process education. Many practicing educators, while paying lip service to the goals, assumptions, and

justifications for process education, fail to perceive the incredible conflict between what they practice and what they preach. Even those that are aware of the conflict usually don't know how to operationalize educational practice consistent with the goals and assumptions of process education. This is understandable. Few people anywhere in the educational enterprise have attempted to systematically develop objectives and procedures for the reform of educational practice to make it consistent with what we know is needed to allow children to achieve the goals of process education. Rather, all parties involved, except for the pupils, have been almost exclusively involved with three usually unrelated areas. These are the creation of slogans, the "nitty-gritty" of factual content of curriculum and instruction, and the organization and maintenance of those institutions called schools.

Process education is needed in our schools because it recognizes the power implicit in the forgotten meaning of education. It also provides insight into the transactions which must occur between the learners, the curriculum, and the teacher if education is to occur in our schools. Its operational implementation can offer at least a degree of needed solution to many current problems. Slogans promise more but deliver less.

SUMMARY

The goals, assumptions, and justifications for process education have been stated and discussed. It has been noted that these have a basis in the theoretical and empirical work of many scholars. Many of the goals and assumptions stated are not new to the educational jargon. However, they have existed primarily as slogans and have had little or no relation to educational practice. Educational practice is based on an implicit and conflicting set of assumptions to the goals of process education. It has also been noted that very little of current educational practice is concerned with education if the proper meaning of the word (educing) is considered.

The multiple and confused meanings of process education have been noted and discussed. A definition of process, processes, and education has been attempted. The definition of these terms, coupled with the stated goals, assumptions, and justifications, should help the meaning of process education to become more denotative and extensional. (It has been suggested that the operationalization of educational practice toward the goals of process education can be achieved by stating behavioral expectancy categories for pupils and teachers. A method for this procedure has also been suggested and discussed briefly.) Later chapters will deal with both

the behavioral expectancy categories and the procedures from which they have been derived. It has been concluded that process education is what education should be but has never been. Educational practice is still far from approaching the ideal of process education.

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